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Solid Earth Discussions

Interactive comment on "Multi-quadric collocation model of horizontal crustal movement" *by* G. Chen et al.

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We have gratefully received the comments and suggestions and have amended the manuscript accordingly.

Comment 1: Page 3364, the end of first paragraph, 'Moreover, different researcher can obtain different covariance. . .'. This has to be explained, why and how they were end up with different covariance with the same data and principle?

Response: Thanks for the comment. We have revised this sentence to make it clear. "The covariance functions are usually depended on the following three aspects: (1) the observed data for fitting, (2) the fitting principles, and (3) the parameter setting in the fitting process. As a result, different researchers can obtain different signal covariance

functions even though the used data and principles are the same."

Comment 2: As mentioned above, the motivation of this study has to be clarified. What's the practical purpose of this derived model?

Response: Thanks for the comment. Considering that it is always difficult to construct signal covariance function by fitting observed data, in this paper, we proposed and tested a new combined estimation method using kernel function of multi-quadric fitting model to replace the covariance function of collocation. We have added the motivation in the last paragraph of Introduction section. "In this paper, a new combined estimation method using kernel function of multi-quadric fitting model to replace the covariance function of collocation was proposed and tested."

Comment 3: Page 3370, please all add argument why these four calculated solution have been chosen for evaluation? You can add up a few words for every scheme.

Response: Thanks for the comment. We have added some sentences in the first paragraph of Page 3370 to explain why the other three solutions have been chosen for evaluation. "As we all know, there are three classical and common methods for establishing velocity field, i.e., Euler vector method, the collocation method, and the multi-quadric function method. In order to examine the effective of the proposed multi-quadric collocation model in calculating the horizontal velocity field, the above-mentioned three methods were used for comparison."

Comment 4: Figure 1 has to be better discussed in the text. Please conclude the information one can obtained from the Figure 1. Also, the axes should be explained in the captain

Response: Thanks for the comment. First, we have added some sentences and revised the caption. "Figure 1. The velocity residuals statistics of 85 external check points. The horizontal axes represent the horizontal velocity residuals (N: North; E: East; m/y: meter per year) of check point. The vertical axes indicate the numbers of

check points (i.e., Point Num) with corresponding residuals. Schemes 1-4 represent the models using Euler vector method, the collocation method, the multi-quadric function method, and the proposed multi-quadric collocation model." Secondly, we have concluded some information from Figure 1 and added them to the text. "Figure 1 shows the velocity residual statistical results of 85 external check points. It reveals that for the multi-quadric collocation model proposed in this study, (1) the numbers of external check points whose velocity residuals were between -0.5 and 0 mm/y in east and north components are 24 and 26, respectively, and (2) the numbers of external check points whose velocity residuals were between 0 and 0.5 mm/y in east and north components are 16 and 17, respectively. These numbers were obviously higher than the results derived from Euler vector method, collocation method, and multi-quadric function method, which demonstrated that the proposed multi-quadric collocation method outperformed the other three methods."

Comment 5: English suggestions: Page 3371, line 8 'a deep analysis' –>'a comprehensive analysis'. Page 3367, line 9, remove 'etc'. Line 8, 'are' – > 'is'. Page 3361, line 13, remove 'and difficult problems'. line 18, 'determining' –>'to determine'. Page 3371, line 22, –>'not a single block'. Page 3367 line 16-17, please check the grammar of this sentence.

Response: Thanks for the comment and we have revised them.

Interactive comment on Solid Earth Discuss., 7, 3359, 2015.